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THE

Journal of the Society of Arts,

AND OF

THE INSTITUTIONS IN UNION.

111TH SESSION.] FRIDAY, SEPTEMBER 15, 1865. [No. 669. VOL. XIII.

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Announcements by the Council.

EXAMINATIONS FOR 1866.

The Programme of Examinations for 1866 is now published, and may be had gratis, on application to the Secretary.

Proceedings of Institutions.

GLASGOW MECHANICS' INSTITUTION.—In the forty-second annual report the directors point with a degree of pride to the very prosperous session. With few exceptions the attendance of the classes has been higher than ordinary; while the quality of work accomplished is decidedly superior. With a view to secure a larger attendance in the natural philosophy and chemistry classes, the directors have reduced the fee in these classes to 2s. 6d., entitling students to the membership of the Institution, to attendance on twenty-four lectures, and the use of the library for six months, and the experiment has proved so far successful in both classes. In the Chemistry Class (Dr. W. Wallace) the course of lectures was, this session, devoted to chemical technology, or chemistry applied to manufactures and the useful arts. The number enrolled in the Natural Philosophy Class (Mr. J. P. Smith, C.E.) is 112, and the attendance throughout the session has been little short of that number. The subjects of lectures have been the properties of matter, the principles of mechanics, gravitation, optics, heat, electricity, magnetism, &c. In the Music Class (Mr. Samuel Barr) the teacher was highly pleased with the progress made. The Animal Physiology Class (Mr. John Mayer, F.C.S.), although not numerically strong, has been very successful, both as regards regularity and attendance and the amount of work done. The Elocution Class (Mr. Wm. Moffat) consisted of 22 members, with an average attendance of 16. They have been trained to read distinctly, significantly, and expressively; the progress made by all having been very considerable. The Mechanical Drawing Class (Mr. P. Stewart) has had another very successful session. The classes for Drawing, Painting, and Architecture (Mr. A. D. Robertson) have also been successful. The number enrolled in the class of Practical Mechanics (Mr. J. P. Smith C.E.) is 42, and the attendance throughout the session has been good. The subjects taken up were the principles of mechanics—gravity, strength of materials, theory of structures, principles of equilibrium in simple machines, friction, wheel-work, principles of dynamics, theory of machines, combustion of fuel, generation of steam, steam boilers, &c. A similarly favourable account is given of the English Language and Literature Class (Mr. D. Buchanan). The Writing, Arithmetic, and Book-keeping Class was under Mr. John Macgregor, teacher, and Mr. Robert Stevenson, assistant. The duties of this department had become increasingly arduous, and were, during the past session, shared between the teacher and an assistant. The number of students in attendance demanded all the accommodation available, whilst the work performed was good. In the Mathematics and Arithmetic Class (Mr. A. Thom), the students were arranged into a junior and a senior class. The junior students, in addition to the more advanced rules of arithmetic, read the first three books of Euclid, with the more useful propositions in the fifth and sixth books; algebra, as far as simultaneous equations, and the summation of series. The senior students read the first six, with the eleventh and twelfth books of Euclid; analytical trigonometry, with the application of logarithms to the solution of problems in trigonometry and mensuration. In the senior class the students were permitted to occupy half their time in whatever branch of the science they thought fit, some taking the differential calculus, others trigonometry, mensuration, or navigation. The classes in Latin and Greek (Mr. J. Miller, A.M.) have been attended this session by gentlemen belonging to or preparing for the legal and medical professions; by young men preparing for the University, and by others engaged in commercial and mechanical pursuits. Favourable accounts are given of the French (Mons. Dutoit) and the German (Herr Rehbann) classes. In the Spanish class (Mr. A. Revie) there has been a small increase in the numbers over those of last session, the tickets sold being 49 against 44. Some of the students have made considerable progress. The History and Geography class (Mr. D. Buchanan) and the Botany class (Mr. W. Keddie) have been prosperous. The library contains upwards of 7,000 volumes, a large addition having been made during the year. Besides the students attending the classes, the library is opened to the public at the annual charge of 4s. Considerable additions have been made to the museum, the accommodation of which is now largely extended. The museum is open for the inspection of members and students of the Institution, and friends, free of charge. The tickets sold for the evening classes have been as follows:—Chemistry, 118; Natural Philosophy, 112; Music, 79; Animal Physiology, 19;

Practical Mechanics, 42; Elocution, 22; Botany, 36; Mathematics, 244; Mechanical Drawing, 253; Free-hand and Architectural Drawing, 157; Writing, Arithmetic, and Book-keeping, 384; Grammar, Composition, and Literature, 145; French, 166; German, 36; Spanish, 49; Latin and Greek, 113; Dancing and Calisthenics, 6; History and Geography, 18; total, 1,999. The income has amounted to £2,097 0s. 5½d., and there was cash in hand £375 13s. 4d.

EXAMINATION PAPERS, 1865.

(*Continued from page* 638.)

The following are the Examination Papers set in the various subjects at the Society's Final Examinations, held in April, 1865:—

GERMAN.

THREE HOURS ALLOWED.

Each candidate is expected to translate one of the passages of Section I., to answer some of the questions, and to turn into German several of the sentences and pieces given in Section III. Candidates for a first class, must translate one piece of Section I., answer (*e*), (*f*) and (*g*) of Section II., and render into German 16—20 inclusive, of Section III., and write the essay:—

SECTION I.

1. Dieser Tag war es, um dessentwillen Gustav das baltische Meer durchschiffte, auf entlegener Erde der Gefahr nachjagte, Krone und Leben dem untreuen Glück anvertraute. Die zwei grössten Heerführer ihrer Zeit, beide bisher unüberwunden, sollen jetzt in einem lange vermiedenen Kampfe mit einander ihre letzte Probe bestehen; einer von beiden muss seinen Ruhm auf dem Schlachtfelde zurücklassen. Beide Hälften von Deutschland haben mit Furcht und Zittern diesen Tag herannahen sehen; bang erwartet die ganze Mitwelt den Ausschlag desselben, und die späte Nachwelt wird ihn segnen oder beweinen.

Die Entschlossenheit, welche den Grafen Tilly sonst nie verliess, fehlte ihm an diesem Tage. Kein fester Vorsatz, mit dem Könige zu schlagen, ebenso wenig Standhaftigkeit, es zu vermeiden. Wider seinen Willen riss ihn Pappenheim dahin. Nie gefühlte Zweifel kämpften in seiner Brust, schwarze Ahnungen umwölkten seine immer freie Stirn. Der Geist von Magdeburg schien über ihm zu schweben.

2. Ist Frieden stiften, Hass
Versöhnen ein Geschäft der Hölle? Kommt
Die Eintracht aus dem ew'gen Pfuhl hervor?
Was ist unschuldig, heilig, menschlich gut,
Wenn es der Kampf nicht ist ums Vaterland?
Seit wann ist die Natur so mit sich selbst
Im Streite, dass der Himmel die gerechte Sache
Verlässt, und dass die Teufel sie beschützen?
Ist aber das, was ich dir sage, gut,
Wo anders als von oben konnt' ich's schöpfen?
Wer hätte sich auf meiner Schäfertrift
Zu mir gesellt, das kind'sche Hirtenmädchen
In königlichen Dingen einzuweihn?
Ich bin vor hohen Fürsten nie gestanden,
Die Kunst der Rede ist dem Munde fremd.
Doch jetzt, da ich's bedarf, dich zu bewegen,
Besitz' ich Einsicht, hoher Dinge Kunde,
Der Länder und der Könige Geschick
Liegt sonnenhell vor meinem Kindesblick,
Und einen Donnerkeil führ' ich im Munde.

3. Alter Freund! immer getreuer Schlaf, fliehst du mich auch wie die übrigen Freunde? Wie willig senktest du dich auf mein freies Haupt herunter, und kühltest, wie ein schöner Myrthenkranz der Liebe, meine Schläfe! Mitten unter Waffen, auf der Woge des Lebens, ruht' ich leicht athmend, wie ein aufquellender Knabe, in deinen Armen. Wenn Stürme durch Zweige und Blätter saus'ten, Ast und Wipfel sich knirrend bewegten, blieb innerst doch der Kern des Herzens ungeregt. Was schüttelt dich nun? Was erschüttert den festen treuen Sinn? Ich fühl's, es ist der Klang der Mordaxt, die an meiner Wurzel nascht. Noch steh' ich aufrecht und ein innrer Schauer durchfährt mich. Ja, sie überwindet, die verrätherische Gewalt; sie untergräbt den festen hohen Stamm, und eh' die Rinde dorrt, stürzt krachend und zerschmetternd deine Krone. Warum denn jetzt, der du so oft gewalt'ge Sorgen gleich Seifenblasen dir vom Haupte weggewiesen, warum vermagst du nicht die Ahnung zu verscheuchen, die tausendfach in dir sich auf und nieder treibt? Seit wann begegnet der Tod dir fürchterlich? mit dessen wechselnden Bildern, wie mit den übrigen Gestalten der gewohnten Erde, du gelassen lebtest.

4. Ottokar von Böhmen, ein viel mächtigerer Fürst als der Graf von Habsburg, glaubte keineswegs dem neuen Kaiser gehorchen zu müssen. Dazu kam, dass die östreichischen Stände bittere Klagen gegen König Ottokar erhoben, wie er sie bedrücke und viele Ungerechtigkeit übe. Also liess Rudolph zuerst den König einladen, dass er auf dem Reichstage zu Nürnberg im Jahre 1274 erscheinen und von Rechtswegen den Lehneid leisten solle. Aber der König kam weder diesesmal, noch auf einem zweiten Tage zu Würzburg; und auf einen dritten zu Augsburg, im Jahre 1275, schickte er nur den Bischof Wernhard von Seckau als seinen Gesandten, und dieser war so dreist, vor den versammelten Fürsten eine lateinische Rede anzuheben, worin er beweisen wollte, dass Kaiser Rudolph's Wahl ungültig sei. Rudolph unterbrach ihn, und sprach: "Herr Bischof, wenn ihr etwas mit meinen Geistlichen abzumachen habt, so redet aller Dinge lateinisch, wenn's aber mich oder die Reichsrechte angeht, so redet deutsch, wie es der Brauch ist." Und die Fürsten, da sie inne wurden, der Bischof wolle Rudolph's Kaiserwahl antasten, enthielten sich kaum, dass sie ihn nicht zur Thüre hinaustrieben; aber der König verhinderte es und liess den Bischof am nächsten Tage von Augsburg abreisen.

SECTION II.—GRAMMAR AND IDIOMS.

(a.) Decline *derselbe*, *dieselbe*, *dasselbe*, and *wer*.

(b.) When does the superlative end in *sten* and has *am* before it? Give three examples.

(c.) Decline *das harte Schicksal—schwerer Stein, unser bestes Pferd.*

(d.) Put the definite article before the following substantives, and add the genitive singular and the nominative plural:—*Berg, Kenntniss, Braut, Thaler, Blatt, Loch, Maus, Hand.*

(e.) In what do separable compound verbs differ from the inseparable. Illustrate their differences by three examples.

(f.) State the second person singular, present and imperfect, both in the indicative and subjunctive of:—*Befehlen, bieten, ablassen, verstehen, nachgeben, vermögen, bedürfen.* Add also the participle past of each of these verbs.

(g.) Es ist gar nicht mit ihm auszukommen.
Das wird noch übel ablaufen.
Ich mache mir gar nichts daraus.
Es geht im Hause um.
Er hat sich umgebracht.
Reden Sie doch nicht so ins Blaue hinein.
Der hat das Pulver auch nicht erfunden.
Wer sich nur darauf verstände!
Setzen Sie mir das einmal auseinander.
Damit hat er mir einen Streich durch die Rechnung gemacht.
Er wird nimmermehr auf einen grünen Zweig kommen.

SECTION III.

Translate into German ten of the following passages. The writing, either in English, or German characters, must be very legible.

1. That is all the same to me.
2. I am going to buy three sorts of wine.
3. He arrived in town at half-past three in the morning.

4. They have been in this country these sixteen years.
5. They who are cruel cannot be good.
6. We who have long experience know more about it.
7. I should like to know what has become of them.
8. My brother is only eight years and a half old.
9. They have been obliged to leave town.
10. He had a new carriage made for him.
11. The judge ordered him to be whipped.
12. I have often been asked about the cause of it.
13. He ought to have been ashamed of himself.
14. The older he grows, the weaker he becomes.
15. We have heard her sing but once.
16. We received their answer but yesterday.
17. I insist upon your doing it directly.
18. Having left his house but ten minutes ago, he cannot have reached his office.
19. She is said to be a very clever writer.
20. It seems clear, that the wages of labour, estimated in money, were in 1685 not more than half of what they are now; and there were few articles important to the working man, of which the price was not in 1685 more than half of what it is now. Beer was undoubtedly much cheaper in that age than at present. Meat was also cheaper, but was still so dear that hundreds of thousands of families scarcely knew the taste of it. In the cost of wheat, there has been very little change. The average price of the quarter, during the last twelve years of Charles the Second, was fifty shillings. Bread, therefore, such as is now given to the inmates of a workhouse, was then seldom seen, even on the trencher of a yeoman or of a shopkeeper. The great majority of the nation lived almost entirely on rye, barley and oats.

Write in German a short essay on "The causes of strikes."

(*To be continued.*)

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

BIRMINGHAM, 1865.

The business of the Sections commenced on Thursday, the 7th instant. The following is a list of the papers read:—

THURSDAY, SEPTEMBER 7TH.

SECTION A.—MATHEMATICAL AND PHYSICAL SCIENCE.

President's address.

Fleeming Jenkin—Report of the Electrical Standards Committee.

James E. Glaisher—Report on Luminous Meteors.

Professor Rankine—On the Second Law of Thermodynamics.

R. Sabine—On a New Method, introduced by Messrs. Siemens, of measuring Electrical Resistance.

W. Hooper—On India-rubber, as an Insulator for Telegraphic Conductors.

A. Claudet—On Moving Photographic Pictures.

H. C. Sorby—On a New Form of Spectrum Microscope.

SECTION B.—CHEMICAL SCIENCE.

Opening Address by the President.

H. C. Sorby—On a New Form of Spectrum Apparatus as applied to the Microscope.

F. A. Abel—Notes on Compounds of Copper and Phosphorus.

Dr. A. Voelcker—On the Composition of a Marine Boiler Deposit.

Dr. T. Phipson—On Silicium in Iron.

Dr. T. Phipson—On the Sublimed Oligist of Vesuvius and its Artificial Production.

Dr. T. Phipson—A few words on Sponges as a source of Bromine and of Nitrogen.

SECTION C.—GEOLOGY.

The President's Address.

Rev. W. S. Symonds—On some Ancient Drifts and Old River Beds of Siluria.

W. Pengelly—The Insulation of St. Michael's Mount.

Rev. W. Purton—The Geology of Colebrookdale.

G. Maw—On the Extensive Deposits of White Clays and Sands in North Wales—antecedent to the Boulder Clay Drift.

C. J. Woodward—On a Deposit near Lilleshall, Salop, containing recent Marine Shells.

Professor Harkness and H. Nicholson— Additional Observations on the Geology of the Lake Country.

SECTION D.—ZOOLOGY AND BOTANY.

J. Gwyn Jeffreys, F.R.S.—Report on Dredging in the Channel Islands. (Mollusca.)

Rev. A. Merle Norman, A.M.—Report of the Committee appointed to investigate the Marine Fauna of the Channel Islands. Part II.

J. Gwyn Jeffreys, F.R.S.—Report on Dredging on the Coast of Aberdeen.

William Hinds, M.D.—On the Identity of Origin of Starch and Chlorophyll.

W. R. Hughes, F.L.S.—Notes on the Development of a Deep-Sea Sponge in a Marine Aquarium.

Rev. A. W. McKay—On the Turdus Migratorius.

H. T. Stainton, F.L.S.—On the extraordinary Partiality shown by insects of the Genus Laverna for Plants of the order Onagraceæ.

S. Moffat, M.D., F.G.S.—Phosphorescence in connection with Storms and Disease.

SUB-SECTION D.—PHYSIOLOGY.

The President's Address.

Dr. John Davy—On the Effects of Scanty and Deficient Food.

Dr. Lionel S. Beale—On Life.

Dr. John Hughes Bennett—Oh the Formation of Pus in Reference to the Fallacious Doctrine of Cell Pathology.

SECTION E.—GEOGRAPHY AND ETHNOLOGY.

Captain Wilson and Captain T. McNeil—Results of Surveys in Palestine.

G. Grove—On the Exploration of the Holy Land, as proposed by the Palestine Exploration Fund.

Colonel L. Pelly—Seychelle Islands.

S. W. Baker—Letters on the discovery of Albert Nyanza, from Mr. S. W. Baker to Sir R. I. Murchison.

Colonel L. Pelly—Comoro Islands.

D. A. Vámbéry—Origin of the Hungarians.

Colonel Phayre—Ethnology of the Hindu-Chinese Nations.

Colonel L. Pelly—Shores of the Persian Gulf.

Robert Swinhoe—Notes on Formosa.

SECTION F.—ECONOMIC SCIENCE AND STATISTICS.

The President's Opening Address.

Thomas Avery—On the Municipal Expenditure of the Borough of Birmingham.

W. L. Sargant—On the Vital Statistics of Birmingham.

Reports on Local Industries (First Group):

George Heaton—Die Sinking.

J. P. Turner—Button Manufacture.

W. Bridges Adams—On the Division of Labour.

SECTION G.—MECHANICAL SCIENCE.

President's Address.

Sir W. G. Armstrong, C.B., F.R.S.—On Chain proving.

E. A. Cowper—On a new Cotton Gin for separating the fibre from the seed.

Thomas Levick—On machinery for compressing air, and the applicability of such compressed air for working coal-cutting and other underground machinery.

D. K. Clark—On Torbite (a new preparation of peat) and its uses.

R. W. Thomson—Description of a Rotary Steam Engine.

FRIDAY, SEPTEMBER 8.

SECTION A.—MATHEMATICAL AND PHYSICAL SCIENCE.

Mr. Glaisher (Chairman of the Lunar Committee)—Report of the Committee.

Mr. Birt (Secretary of the Lunar Committee)—On the Progress of the Map of the Moon.

J. B. Capello and B. Stewart—On the Magnetic Storm of the beginning of August last, as recorded by the instruments at Kew and Lisbon.

Dr. Gladstone—On the Refraction Equivalent of Carbon.

Professor H. Smith—Report on the Theory of Numbers.

Professor Stevelly—On the Application of D'Alembert's Principle to the Rotation of a Rigid Mass.

Professor Price—On the Extension of Taylor's Theorem, by the Method of Derivations.

Professor T. A. Hirst—On Quadric Transformations.

Rev. R. Harley—On Differential Resolvents.

Mr. W. H. L. Russell—On the Calculation of the Potential of the Figure of the Earth.

Dr. Mansfield Ingleby—On a Method for discovering remainders in Arithmetical Division.

Oliver Byrne—On Dual Arithmetic.

SECTION B.—CHEMICAL SCIENCE.

Dr. Angus Smith—On a Method of Estimating Carbonic Acid in the Air, with Apparatus.

Dr. Williamson—Report on the Analysis of the Gases evolved from the Bath Waters.

F. Crace Calvert—Notes on the Action of Acids on some Metals and Alloys.

Dr. J. E. de Vry—On the possibility of Manufacturing Neroli in the British Colonies.

Owen Rowland—On the Properties of Parkesine, and its Application to the Arts, Manufactures, and Telegraphy.

F. G. Finch—On the Utilisation of Blast Furnace Slags.

Dr. A. Voelcker—On recently discovered Phosphatic Deposits in North Wales.

Dr. Frankland—On the Constitution of the Acids of Acetic, Lactic, and Acrylic Series.

SECTION C.—GEOLOGY.

Henry Woodward—A description of a new Chart of Fossil Crustacea.

W. M. Williams—Some Vegetable Deposits in the Achensee—North Tyrol.

Geheimrath Von Dechen and Professor F. Römer—On the large Prussian Geological Map of the Rhenish Provinces and Westphalia.

First Report of the Committee for the exploration of Kent's Cavern.

Professor Harkness—On the Metamorphic Rocks and Serpentine Marbles of Connemara and Joyce's Country.

Professor Tennant—On the Agates found in England, with specimens from different countries.

SECTION D.—ZOOLOGY AND BOTANY.

W. Lauder Lindsay, M.D.—On the Relations of the Southern to the Northern Flora of New Zealand.

George Humphry, M.D., F.R.S.—On the Homologies of the Lower Jaw and the Bones connecting it with the Skull in Ovipara.

W. F. Hiern—On Ranunculus radians *Revel* as a British Plant.

Dr. E. Perceval Wright—Notes on the Voracity of Chiasmodus, by Dr. Carte, F.L.S.

Rev. A. M. Norman, M.A.—On the Structure and Development of Salpa spinosa *Otto*, as observed at Guernsey.

Dr. E. Perceval Wright exhibited a Copy of the "Record of Zoological Literature for the Year 1864."

Dr. Jordan—An Examination of the British Lepidoptera, with a view to investigate the Origin of Species.

SUB-SECTION D.—PHYSIOLOGY.

Dr. Fleming—On the Prevalence of Tapeworm in Birmingham and its Causes.

Dr. Cobbold—Remarks on Specimens of Entozoa.

Dr. Cobbold—On Beef and Pork as Sources of Entozoa.

Professor Rolleston—Certain Points in the Anatomy of Lumbricus terrestris.

Dr. Davy—Is the Opinion that a diet of Animal Food conduces to Leanness well Founded on Facts?

Dr. Richard Norris—Rigor Mortis not Muscular Contraction.

SECTION E.—GEOGRAPHY AND ETHNOLOGY.

Thomas Baines—Victoria Falls of the Zambesi.

J. Crawfurd, F.R.S.—Occidental or Western Negroes.

E. B. Tylor—Negro-European Dialects of the Negroes of Surinam and Curaçoa.

Dr. Cullen—Isthmus of Panama and Interoceanic Ship-canal Routes.

Dr. Cullen—Darien Indians.

R. Brown—Researches in Vancouver Island.

T. W. Farrar—Language and Ethnology.

SECTION F.—ECONOMIC SCIENCE AND STATISTICS.

Reports on Local Industries (Second group):—

J. S. Wright—Jewellery and Gilt Toys.

Dr. Lloyd—Flint Glass.

Professor Leone Levi—Statistical Data in relation to the Representation of the People.

G. J. Johnson—Statistics of the Benefit Building and Freehold Land Societies of Birmingham.

SECTION G.—MECHANICAL SCIENCE.

Wm. Fairbairn, LL.D.—Report of the Gun-Cotton Committee.

Henry Bessemer—On the Manufacture of Cast Steel: its Progress and Employment as a Substitute for Wrought Iron.

Wm. Fairbairn, LL.D.—On some of the Causes of the Failure of Submarine Cables, and their Construction.

C. W. Siemens, F.R.S.—On the Sheathing of Deep-Sea Cables.

William Hooper—On India Rubber considered in reference to its Applicability as an Insulator for Telegraphic Conductors.

SATURDAY, SEPTEMBER 9.

SECTION A.—MATHEMATICAL AND PHYSICAL SCIENCE.

Principal J. D. Forbes—On the Laws of the Conduction of Heat in Bars.

J. P. Gassiot—On the Change of Form and Colour which the Stratified Discharge assumes when a varied resistance is introduced in the circuit of an extended series of the Voltaic Battery.

F. Galton—On Spectacles for Divers, and on the Vision of Amphibious Animals.

Captain Selwyn—On some New Arrangement of the Poles in Magnets.

J. P. Harrison—On the Heat attained by the Moon under Solar Radiation.

SECTION B.—CHEMICAL SCIENCE.

This Section did not meet on Saturday.

SECTION C.—GEOLOGY.

S. Bailey—The Economic Value of the various Measures of Coal and Ironstone in the South Staffordshire Coal Field.

H. Johnson—The extent and duration of the South Staffordshire Coal Field.

W. M. Williams—The Ancient Glaciers of the North and East of Llangollen, and more particularly in the Hope Mountain.

Principal Dawson—The Successive Palæozoic Floras in Eastern North America.

Rev. W. Fox—An Account of the New Saurian *Polacanthus* from the Wealden.

Rev. H. Housman—Fossil Footprints in the New Red Sandstone at Brewood, near Wolverhampton.

R. A. Peacock—On extensive and deep Sinkings of Lands in the Channel Islands Seas, and on some Changes of the French Coast of the Bay of Biscay within the Historical Period.

R. A. Peacock—On Steam as an active agent in Earthquakes.

D. Mackintosh—The relative extent of Atmospheric and Oceanic Denudation, with a particular reference to certain rocks and valleys in Yorkshire and Derbyshire.

Rev. A. M. McKay—The Red Sandstone of Nova Scotia.

J. E. Taylor—On Contortions in the Chalk at Withingham, near Norwich.

J. W. Salter—Explanation of a Map of the Faults in the Gold District of Dolgelly.

T. A. Readwin—On the recent Discovery of Gold at Gwynfynydd, North Wales.

SECTION D.—ZOOLOGY AND BOTANY.

This Section did not meet on Saturday.

SUB-SECTION D.—PHYSIOLOGY.

This Sub-Section did not meet on Saturday.

SECTION E.—GEOGRAPHY AND ETHNOLOGY.

J. Crawfurd—History of Cannibalism.

Dr. R. S. Charnock—Cannibalism in Europe.

J. Crawfurd—Papuan and Oriental Negroes.

Dr. Mueller—McIntyre's Journey across Australia, and Discovery of Traces of Leichhardt.

R. Dunn—On the influence of Civilization upon the Cerebral Development of the different Races of Men.

R. Swinhoe—On the Native inhabitants of Formosa.

SECTION F.—ECONOMIC SCIENCE AND STATISTICS.

This Section did not meet on Saturday.

SECTION G.—MECHANICAL SCIENCE.

This Section did not meet on Saturday.

MONDAY, SEPTEMBER 11.

SECTION A.—MATHEMATICAL AND PHYSICAL SCIENCE.

James Glaisher—Report of the Balloon Committee.

G. J. Symons—Report on the Rainfall of the British Isles.

Dr. Gladstone—Interim Report of the Committee on the Transmission of Sound under Water.

F. W. Brearey—Remarks upon Aërial Navigation, suggested by Mr. Glaisher's late ascents.

A. F. Osler—On the Horary and Diurnal Variations in the Direction and Motion of the Air.

A. F. Osler—Suggestions respecting an Anemometer adapted for recording the Force of Hurricanes.

Professor Price—On some Applications of the Theory of Probabilities.

W. Symons—On an Improved Standard Barometer.

S. B. Howlett—On a Self-recording Anemometer.

SECTION B.—CHEMICAL SCIENCE.

Professor Wanklyn—Report on some of the Differences between the Normal and the Beta Alcohols.

Dr. D. S. Price—On the Action of Light upon Sulphide of Lead, and its bearing upon the Preservation of Paintings in Picture Galleries.

Report of the Committee on Gun Cotton.

Manning Prentice—The Progress of the Manufacture of Gun Cotton and its application to Mining, Military, and Sporting purposes.

W. L. Scott—On the Action of Alkali Metals on Gun Cotton.

W. L. Scott—On Arseniuretted and Antimoniuretted Hydrogens.

J. Smyth, Jun.—On an Apparatus for the determination of Ozone, and experiments made therewith.

Dr. De Vry—On the Rotatory Power of several Essential Oils.

Dr. Macadam—On Esparto Fibre, or Spanish Grass, and its employment in the Manufacture of Paper.

Dr. Macadam—On the Results of Agricultural Experiments made in 1864.

D. Forbes—On some Minerals from South America. On the Colour of Gold as seen by transmitted light.

T. Fairley—On the Reactions of Cyanogen. Note on Glycocine, with tables.

SECTION C.—GEOLOGY.

H. Hicks and J. W. Salter—Report on Further Researches in the Lingula Flags of South Wales.

D. Forbes—First Report on the Igneous Rocks of Staffordshire.

W. Molyneux—Further Report on the Distribution of the Organic Remains of the North Staffordshire Coal Field.

C. Twamley—On the Faults in the South Staffordshire Coal Field and their relation to the Igneous Rocks of the District.

W. Ness—On the Coal Measures in Mold Valley and their Products.

Rev. P. B. Brodie—On the Fossiliferous Beds of the New Red Sandstone (Upper and Lower Keuper) in Worcestershire.

Professor Harkness and H. Nicholson—On the Silurian Rocks of the Isle of Man.

H. Woodward—Description of a new Phyllopodous Crustacean from the Moffat Shales, Dumfriesshire.

E. Ray Lankester—On British Species of Cephalaspis and the Scotch Pteraspis.

Rev. La Touche—On the Nodules in the Limestone of Wenlock Edge.

SECTION D.—ZOOLOGY AND BOTANY.

Dr. Duncan—A description of Two New Species of Aporose Madreporaria, from Guernsey.

Dr. Scott—On the Occurrence of Orcynus alalonga on the Coast of Devon.

C. Spence Bate and Professor Westwood—On the genus Anceus (Anceus *Risso* and Praniza *Leach*).

E. Ray Lankester—Notes on Annelida from the Coast of Guernsey.

P. P. Carpenter—On the regard due to usage and utility, as well as mere priority in fixing Zoological Nomenclature.

F. Buckland—Report on the Culture of Oysters.

H. S. Ellis—To Exhibit some Tiles with young Oysters.

Dr. Mörck—On the Classification of the Mollusca.

Dr. Mörch—On the Zoological Affinities of the Mollusca.

Ed. Newton, M.A., a letter from, relating to a Remarkable Discovery of Bones of Didus in the Island of Rodriguez.

Rev. F. Hewlett—On the occurrence of the bones of extinct Struthious Birds in New Zealand in the same Oven with those of the Dog.

SUB-SECTION D.—PHYSIOLOGY.

Dr. B. W. Richardson—Report on Amyl Compounds.

Dr. George D. Gibb—Refutation of the view recently propounded that the food comes into contact with the vocal cords in deglutition.

William Turner—On Variability, as manifested in the construction of the human body.

Professor Rolleston—Certain points in the Anatomy of two Animals from the Mammoth Cave, Kentucky.

SECTION E.—GEOGRAPHY AND ETHNOLOGY.

C. R. Markham—On a North Polar Expedition.

Admiral Ommanney—On North Polar Exploration.

T. Wright—On the true assignation of the Bronze Weapons, &c., supposed to indicate a Bronze Age in Western and Northern Europe.

D. Macintosh, F.G.S.—On the Comparative Anthropology of England and Wales.

J. Evans, F.R.S.—On the Worked Flints of Pressigny le Grand.

Dr. Charnock—On the Origin of the Gipsies.

SECTION F.—ECONOMIC SCIENCE AND STATISTICS.

David Morris—On the past and present Productive Power of Cotton Machinery.

Mr. Edward Vivian, M.A.—On the admission of Illegitimate Children into Workhouses, as a means of preventing Infanticide.

Professor Rogers—On Patents and Copyright.

SECTION G.—MECHANICAL SCIENCE.

F. J. Bramwell—On Weldless Tyres, Circular Rolling and Railway Wheels.

S. N. F. Cox—On Siemens' Regenerative Gas Furnaces and Producers.

J. Robinson—On some Developments of, and Improvements in, Giffard's Injector.

George Fawcus—Suggestions for Improvements in Blocks for Lowering Ships' Boats: Improvements in Boats.

Cornelius Varley—On the Ventilation of Separate Rooms, and of Large Assemblies, and Coal Mines.

TUESDAY, SEPTEMBER 12.

SECTION A.—MATHEMATICAL AND PHYSICAL SCIENCE.

Professor Plücker—On a New Method in Geometry.

Professor Sylvester—On a Peculiar Class of Questions in the Theory of Probabilities.

Professor Sylvester—On Professor Price's Modification of Arbogast's Method.

Professor A. H. Curtis—On certain Theorems in Laplace's Discussion of the Figure of the Earth and Precession and Nutation.

Professor T. A. Hirst—On Chasles' Method of Characteristics.

J. B. Capello—On the great Storm of December, 1864, on the Coast of the Peninsula.

J. Hartnup—On the Self-registering Barometer at the Liverpool Observatory.

T. L. Plant—On the Anomalies of our Climate.

D. Smith—On the Meteorology of Birmingham from 1853 to 1864.

L. Oertling—On the Hydrometer.

Captain Lendy—On the Topograph, a new Surveying Instrument.

Cornelius Varley—On an Instrument by which any Rainbow that is possible to appear within the area of any picture may be indicated in its right place and of the true size.

SECTION B.—CHEMICAL SCIENCE.

T. Wood—On the New Formulæ with reference to Schools and Examinations.

Professor Maskelyne—On Crystallised Melaconite and Tenorite.

W. White exhibited Photographs of the Interior of the Great Pyramid taken with the Magnesium Light by Professor C. Piazzi Smyth, with notes thereon.

W. Willis—On the Aniline Process in Photography.

W. L. Scott—On the Formation of Ammonia from Nitrogen in the Atmoshpere.

W. L. Scott—On the Presence and Functions of Ammonia or its Homologues in the Blood.

J. C. Bowring—On the Preservation of the Sheathing of Ships, and Extraction of Silver from Sea Water, by means of Electricity.

J. C. Bowring—On the Direction of the Electric Current.

A. Hill—On the Sanitary and Economical Aspects of the Sewage question.

H. Bird—Observations on the Utilisation of Sewage, as conducted at Stroud, and on the Growth of the Sewage Plant.

SECTION C.—GEOLOGY.

Professor Phillips (President of the Association)—On Glacial Striation.

Dr. L. Adams and Professor Busk—First Report on the Exploration of the Maltese Caverns.

E. Whymper—A few notes on the Structure of the Matterhorn.

Prof. F. Römer—On a Fossil Spider from the Coal Measures of Upper Silesia.

Principal Dawson—On the Fossil Plants of the Post Pliocene deposits of Canada in connection with the climate of the period, and the Formation of Boulder Clay.

Rev. P. B. Brodie—Remarks on the Drift in part of Warwickshire, and on the evidence of Glacial action which it affords.

A. Startin—On the Drift in the parish of Exhall, north of Coventry.

J. G. Jeffreys—Notice of the occurrence of certain Fossil Shells in the sea-bed adjoining the Channel Islands.

C. Ketley—On the Silurian Rocks and Fossils of Dudley.

Dr. H. P. Holl—On the Pre-Cambrian Rocks of Central England.

Rev. P. B. Brodie—On a section of Lower Lias at Harbury, and on two new species of Corals in the Lias of Warwickshire.

E. C. H. Day—On the Lower Lias of Lyme Regis.

E. C. H. Day—On a Head of *Hybodus De la Bechei.*

E. C. H. Day—On the History of the Jurassic Seas, as evidenced by the History of the first Liassic Sea.

Professor Buckman—On the Oolite Sands of Dorset.

Mr. Pines—On the White Lias of Warwickshire.

SECTION D.—ZOOLOGY AND BOTANY.

Dr. Crisp—On the Relative Weight of the Brain in relation to the intelligence in the Vertebrata.

W. R. Hughes—Exhibited Specimens of Lepidogaster bimaculatus and L. cornubiensis.

Dr. Sclater—On the birth of a young Hippopotamus in the Zoological Society's Gardens, Amsterdam.

C. Spence Bate—Report of the Committee appointed to explore the marine flora and fauna of the southern coasts of Devon and Cornwall.

Dr. Jordan—Exhibited an abnormal growth of a bud of a Birch Tree.

Thomas J. Moore—Remarks on some improved methods of displaying Birds in public Museums, illustrated by specimens from the Derby Museum, Liverpool.

Sir J. Lubbock, Bart.—On the Metamorphoses of Ephemera (Chlœon).

H. Woodward—Exhibited a chart of recent and fossil Crustacea.

Dr. Cleghorn—On the Deodar Forests of the Western Himalaya.

Dr. Mörck—On the Scope of Zoological Enquiries.

Dr. Prideaux—Phrenology, or the physiology of the brain, the most important department of Ethnology.

SUB-SECTION D.—PHYSIOLOGY.

Dr. G. M. Humphry—Observations on a Female Skeleton, aged 104.

Samuel H. Parkes—On the early Development of Organs in Embryonic Life.

Dr. B. W. Richardson—Physiological Experiments with Ozone.

Dr. W. Dickenson—Functions of the Cerebellum.

Dr. Shettle—A few Remarks on the Causes of the Cattle Murrain.

SECTION E.—GEOGRAPHY AND ETHNOLOGY.

W. Chandless, M.A.—Ascent of the River Purus.

Dr. Vámbéry—City Life of Bukhara.

Sir H. Rawlinson—Notes on the Russian Frontiers in Central Asia.

C. Carter Blake—On certain Simious Skulls, with especial reference to a skull from Louth, in Ireland.

A. Adams Reilly—On a recent Survey of the Chain of Mont Blanc.

E. Whymper—On some new Expeditions in the Chain of Mont Blanc, including the Ascent of the Aiguille Verte.

G. S. Mathews—Ascent of Mont Blanc by the glacier de Brenva.

Colonel Pelly—On Arabia.

Rev. Dunbar J. Heath, M.A.—On the Antropoid and Mute Origin of the European Races, versus the theory of migration from an external source.

SECTION F.—ECONOMIC SCIENCE AND STATISTICS.

Report of the Committee appointed to consider the question of uniformity of Weights and Measures.

F. P. Fellows—On the practical advantages of the Metric System of Weights and Measures.

James Yates—On Mural Standards for exhibiting the Measures of Lengths legalised in the United Kingdom.

Alfred Hill—Statistics of the Post-office Savings Bank.

T. de Meschin, LL.D.—On the proposed Extension of Government Administration to Railways.

J. Thackray Bunce—Statistics of Crime in Birmingham, as compared with other large towns.

Reports on Local Industries—Papier Mâché, Steel Wire, Steel Pens, Crown and Sheet Glass, Brassfounding, Lighthouse Lamps and Reflectors, Iron Manufacture of Staffordshire, and Stained Glass.

SECTION G.—MECHANICAL SCIENCE.

Professor Rankine, LL.D., F.R.S.—Report of the Committee for experimenting on the difference between the resistance of water to floating and immersed bodies.

W. Fairbairn, LL.D., F.R.S.—On the strength of material considered in relation to the construction of Iron Ships.

E. A. Cowper—On the effect of Blowing Blast Furnaces with blasts of very high temperature.

J. M. Clements—On a Machine for stitching Button Holes.

Sir J. Burgoyne, K.C.B., F.R.S.—On Railways in War.

James Yates, F.R.S.—On Mural Decimal Standards.

George Burt—On a Pneumatic Hammer.

W. D. Grimshaw—On an Atmospheric Hammer.

William Sissons—On Steam Pile driving.

Owen Rowland—On Electric Torpedos.

Brooke Smith—On Warming, Lighting, and Ventilating the Birmingham Town Hall.

Nathaniel J. Holmes—On District Private Telegraphs.

WEDNESDAY, SEPTEMBER 13.

SECTION C.—GEOLOGY.

Rev. W. Holland—Remarks on the Geology of parts of the Sinaitic Peninsula.

D. Forbes—On the Existence of Gold-bearing Eruptive Rocks in South America, which have made their appearance at two very distinct Geological epochs.

G. Maw—On some Fossiliferous Slates occurring between the Bunter Sandstone and Mountain Limestone of the Vale of Clydd, North Wales.

W. S. Mitchell—On hitherto unrecorded Leaf Forms, &c., from Alum Bay, Isle of Wight.

G. R. Rumney—On a Coal Field in Brazil.

L. Percival—On a Recent Example of the Formation of Pyrites in a South Staffordshire Coal Pit.

G. E. Roberts—Notes on the Theory of Repulsion as Illustrative of Physical Geology.

Rev. W. Fox—On a New Wealden Saurian named *Polacanthus*.

H. Seeley—How England got her Tertiary Rocks.

H. Seeley—On the Upper Green Sand.

H. Seeley—On a Serpent-like Lizard from the Lower Chalk.

H. Seeley—On the Reptiles of the Cambridge Green Sand.

W. Von Haidinger—On the Progress of the Imperial Geological Institute of the Austrian Empire.

L. P. Capewell—Organic Remains of the Coal Measures.

SECTION D.—ZOOLOGY AND BOTANY.

Miss Irby and Miss Mackenzie—On the Characteristics of the South Sclavonic Race.

John Thrupp—On the Domestication of certain Animals in England between the 7th and 11th Centuries.

C. R. Markham—On the Arctic Highlanders.

Dr. Roe—On the Esquimaux.

Dr. Crisp—On the External Form of the Brain and Hand in the Orang.

Dr. Crisp—On the Food and Habits of the Mole, Sparrow, and Vespidæ.

E. J. Lowe—On the Propagation of Ferns by Means of Spores.

Dr. Hinds—On a Monstrosity of the Rose.

Rev. W. H. Sterling—On the Natives of Patagonia and Terra del Fuego. Some boys from Terra del Fuego were introduced to the Section.

SUB-SECTION D.—PHYSIOLOGY.

Dr. M. Foster—On Pericardial Fluid.

Prof. Macdonald—On the Parasitoid Type of the early Fœtal Development.

Dr. A. Gamgee—Note of Experiments confirmatory of those of Kühne on the non-existence of Ammonia in the Blood.

Dr. W. H. Lightbody—On the Vascular Arrangements of the Cornea.

SECTION F.—ECONOMIC SCIENCE AND STATISTICS.

J. D. Goodman—Statistics of the Small-Arms Manufacture of Birmingham.

Rev. J. W. Bain—The Social, Moral, and Educational Status of the population of South Staffordshire.

Professor Bennett—Statistics of Pneumonia.

G. B. Galloway—Suggested Improvements applicable to the City of London, and other large towns, to improve Health and preserve Life.

G. B. Galloway—Means of Saving Life from Buildings which may be on Fire.

G. B. Galloway—Inter-communication between Railway Passengers.

J. T. Arlidge, M.B.—On the Duration of Life, the prevailing Diseases, and the Causes of Death of Potters.

Robert Wilkinson—A statistical review of the police-recognised drunkenness of the metropolis.

Henry C. Roper—The Physical and Geographical Features of the Country ten miles round Dudley, with remarks upon the natural drainage area as bearing upon the Sanitary Condition of the district.

TECHNICAL TRAINING OF ARTISANS.

The following account of the institutions for the technical training of artizans in France has been prepared by Mr. J. F. Iselin, from the documents collected by Mr.

T. Twining, in pursuance of the inquiry adverted to in the *Journal of the Society of Arts* for January 13, 1865:—

With a few special and important exceptions, which there will be occasion to notice further on, the whole of the technical instruction of France is under the immediate direction of the Minister of Agriculture, Commerce, and Public Works. Among the establishments which are directly under state supervision, are the Polytechnic School (*École Polytechnique*), the School of Bridges and Roads (*École Impériale des Ponts-et-Chaussées*), and the School of Mines (*École Impériale des Mines*). These, however, are chiefly for the instruction of Government officials.

The Central Imperial School of Arts and Manufactures (*École Centrale des Arts et Manufactures*), at Paris, was founded in 1829, as a private establishment, under the business direction of M. Lavallée, who was also its original capitalist. Dr. Lyon Playfair,* having visited it in 1852, speaks in the highest terms of this institution.

The only assistance which at that time it received from Government was in the form of an endowment for a certain number of exhibitions to educate students of humble means. The Councils-General of Departments occasionally grant a similar favour to deserving young men. As a commercial speculation, this school seems to have been singularly successful. That it has been highly appreciated by those for whose benefit it was established, will be seen by the following extract from a Report by the Budget Committee of the Chamber of Deputies:—

"You know, gentlemen, this useful establishment, founded in 1829 by the association of eminent professors, with the intention of forming civil engineers, the directors of works, the chiefs of workshops and factories. This private institution, which in its importance rivals in excellence our first public establishments, has created and put in practice a complete system of industrial education. It is at the same time a supplement to our Polytechnic School and an addition to our various schools of application. Such an institution ministers to one of the first necessities of the age, and therefore its success is complete. This is confirmed by the unanimous opinion of the first manufacturers of the country, and by the ease with which all the pupils educated at it have received employment."

The report here quoted was made shortly before Dr. Playfair's visit, when the school was attended by 300 students, all day pupils (*externes*), instructed by a staff of forty professors. The annual school fees amounted to £36. The courses of instruction were arranged to extend over three years,† "in the second year the practical operations being divided into two parts, the one general and the other applicable to one of the following four specialities,—mechanists, engineers, metallurgists, chemists."

In 1858 this school was given up to Government, and is now, like most other technical schools in France, under the direction of the Minister of Agriculture, Commerce, and Public Works, as above stated. The system and courses of instruction remain the same as under the former régime. The latter comprise Descriptive Geometry, Practical and Theoretical Mechanics, Analytical and Industrial Chemistry, Metallurgy, Mining, and Geology, as well as the direct and practical application of these sciences to the industrial arts. The classes are open to foreigners, and it is a remarkable proof of the estimation in which the school is held, that Belgium, Germany, Spain, and even England, not only send pupils there for the benefit of a technical education which they are unable to receive in their own country, but also show themselves anxious to obtain the services of other pupils of the establishment as managers of some of their most important manufactures. Indeed, General Morin and M. Tresca* complain that scarcely 50 per cent. of the students who have passed the school remain in France; the remainder obtain situations on foreign public works and railways.

Much, however, as is done by this school for the advancement of technical knowledge, it will be perceived that the advantages which it offers are confined to the higher classes of the technical community. It is in fact admirably adapted to provide the more scientific industries of the country with trained and able managers and masters; but it offers no corresponding benefits (nor is it intended to do so) to artisans engaged in handicraft trades.

CONSERVATOIRE OF ARTS AND TRADES (*Conservatoire des Arts et Métiers*.—This magnificent establishment owes its origin to the collection of machines, models, and philosophical instruments left to the French nation by the great mechanician, Vaucanson, in 1783, which became the nucleus of the present splendid museum. It will not here be necessary to give a description of these remarkable collections, already well known in England; it is desirable rather to call attention to the educational work undertaken by the institution. The royal ordonnance of 1819, creating four professorships in science—mechanics, physics, chemistry, and public economy applied to industry—first gave the Conservatoire an educational character, and since that time the addition of other professorships has still further increased its usefulness.† The present scheme of this institution is the instruction of the working classes in the principles of the sciences bearing on their trades and manufactures by means of lectures delivered by the professors. In addition, the large amphitheatre of the establishment is used for public lectures. When any discovery or invention is made, either in France or in foreign countries, of sufficient interest to arts, industry, or commerce, drawings or exact descriptions are obtained, deposited in the amphitheatre, and publicly explained. All new processes are likewise shown by practical and experienced workmen, under the direction of the several professors.

The following was the programme of free and gratuitous lectures for the years 1863 and 1864:—

Applied Geometry	Prof.	Baron C. Dupin.
Descriptive Geometry	,,	M. de la Gournerie.
Applied Mechanics	,,	M. Tresca.
Building Construction	,,	M. Trélat.
Physics	,,	M. E. Becquerel.
Applied Chemistry	,,	M. E. Peligot.
Chemical Manufactures	,,	M. Payen.
Agriculture	,,	M. Moll.
Agricultural Chemistry	,,	M. Boussingault.
Zoology	,,	M. Baudement.
Spinning and Weaving	,,	M. Alcan.
Printing and Dyeing	,,	M. Persoz.
Industrial Legislation	,,	M. Wolowski.
Industrial Economy and Statistics	,,	M. J. Burat.

It appears from the statements of General Morin and M. Tresca that the influence of this institution is, like that of the preceding one, rather confined to the higher industrial classes.

Not less important in their action in the progress of French industry, and by some even thought more beneficial, are the three Schools of Arts and Trades (*Écoles Impériales des Arts-et-Métiers*), established at Châlons,

* Industrial Instruction on the Continent, being the Introductory Lecture delivered at the Government School of Mines for the Session 1852-53, by Lyon Playfair, C.B., F.R.S. (Longman, 1852).

† Dr. Playfair's Introductory Lecture.

* Rapports des membres de la Section Française du Jury International sur l'ensemble de l'Exposition. Classe xxix.—Méthodes et matériel de l'enseignement élémentaire. Section viii.—Enseignement industriel, par M. le Général Morin, membre de l'Institut, directeur du Conservatoire des Arts et Métiers, et M. Tresca, sous-directeur du Conservatoire des Arts et Métiers.

† Papers relating to proposals for establishing Colleges of Arts and Manufactures for the better instruction of the industrial classes, by Lt.-Col. J. A. Lloyd, F.R.S., F.G.S., Special Commissioner at the Exhibition of 1851.

Angers, and Aix, so situated as conveniently to embrace in their influence the whole extent of the country.

The following description is abridged from the prospectus issued by the Minister of Agriculture, Commerce, and Public Works:—

The Imperial Schools of Arts and Trades are designed to form foremen and heads of workshops (*chefs d'ateliers*), as well as skilful and well-informed workmen. The course of study extends over three years. The instruction is both theoretical and practical. The former comprises the French Grammar, Geography, Writing, Descriptive Geometry and Machine Drawing, Arithmetic and Book-keeping, Geometry, Algebra up to and inclusive of Quadratic Equations, Mechanics, and the Elements of Chemistry and Physics. The practical instruction is given in four workshops, and embraces forging and founding, working in wood and at the lathe, and the fitting both of machines and models. The works executed are of the same nature as those issued from any well-arranged factory, such as steam-engines, machine-tools, and pumps, besides ironwork and hardware, and carpenters' and joiners' work.

In each school there is room for 300 pupils, some of whom are exhibitioners. All of them are boarders (*internes*), no day-scholars (*externes*) being received. They are admitted every year by competition at an examination held in the beginning of August before a local board (*jury spécial*) in each department. Every candidate for admission must be, at the time of his entering the school, between fifteen and seventeen years of age; be able to read fluently, to write a current hand, to spell, to work the first four rules of arithmetic, with vulgar and decimal fractions; have a knowledge of the elements of plane geometry and linear or ornamental drawing; and have completed an apprenticeship to some trade or handicraft analogous to those taught in the school. The admission is confined to natives of France; a foreigner is allowed to compete only under exceptional circumstances, and by special permission of the superior administration.

The fees for board and tuition amount to £24 (600f.) a year, and a sum of £8 (200f.) is required to be deposited by way of outfit before the pupil can enter the school. There is, however, a very liberal allotment of exhibitions, partly supported by the Government and by the departmental budgets, in addition to which, each school possesses 25 scholarships (*bons de dégrèvement*), reducing the school-fees by one-fourth, which are distributed to the pupils at the termination of the annual examination.

At the end of the third year, the students about to leave receive each a certificate of the marks they have obtained during their school course, and of the position they have held every half-year in their respective classes. No other diploma is given. At the same time the first fifteen of such students receive a silver medal, and can also claim, at the end of one year, a sum of £20 (500f.) to be used as a premium in establishing themselves in business. Another prize of £15 (375f.) is given to the best pupil in each workshop. Finally, to the three pupils among the above-mentioned fifteen most distinguished for progress in their studies and for good conduct, a sum of £100 (2,500f.) is distributed, being the interest of an endowment left to the schools by M. Jourdain, an eminent manufacturer. Thus nothing is wanting in the way of prizes to stimulate exertion and reward proficiency and good conduct.

The results attained are stated by the director of the school of Chalons to be most satisfactory. He more particularly claims attention for the geometrical drawing, in which he says his pupils exhibit remarkable ability. It rarely happens that three months elapse after a pupil leaves one of these schools, before he obtains advantageous employment.

It will be asked—what influence do these schools exercise on French industry? The answer may be given in the words of General Morin and M. Tresca:—"Every year they turn out and send into our factories three hundred young men, with mind and hand both formed. Some, and these are the majority, establish themselves as draughtsmen, and display great skill in fitting and arranging machinery, and in devising the most suitable forms. The remainder, after having wrought as workmen, attain quickly the position of foreman, and often are able to commence on their own account a manufactory of metal ware or a carpenter's shop. We are in a position to instance a large number of manufacturers of the first rank, who have received their education at the schools of arts and trades. Distinguished by their principals for their practical ability, they were promoted to the direction of important factories. Not less than a fifth of the number of members of the Society of Civil Engineers were formerly students at these schools."

It will be noticed that in these schools more attention is paid to the practical portion of technical instruction than in the institutions before described. The workshops, where the pupils are brought face to face with the details of manufacture, and in which they are compelled to take their share of manual labour, form a distinguishing feature and a valuable addition.

In founding an institution of this kind in England one of the desirable changes would be a still greater extension of its sphere of action in certain directions, especially as regards what may be called the domestic handicrafts; but far more important modifications would be required in order to open the enjoyment of its benefits to the generality of our working population. It must be borne in mind that in France the workmen's sons who constitute the majority of the candidates to the free schools in question are enabled, through the gratuitous educational facilities afforded to them, to give proof, in the examinations for admission, of a degree of knowledge which only the favoured few among our own rising industrial generation can at present command.*

MINING SCHOOL (*Ecole des Mineurs*) AT ST. ETIENNE, AND SCHOOL FOR MASTER MINERS (*Maître Mineurs*), AT ALAIS.—These mining schools, the only French institution for special industrial training under government direction remaining to be noticed, are less numerously attended than the trade schools, but have an equal proportion of success. The purpose for which they were established is to render the same kind of assistance to the mining industry which the trade schools afford to manufactures. Both of them are under the management of the engineers of the Imperial Corps of Mines.

The two schools, however, have different objects in view. At St. Etienne the programme of the conditions of admission is very nearly the same as that for the Schools of Arts and Trades. The pupils are fitted to become viewers and captains of mines or directors of metallurgical works. Alais is intended to turn out master miners only, and the pupils on their admission are not submitted to an examination in either geometry or drawing. During their attendance at the schools they work in the mines on the footing of ordinary miners, and they are supposed to earn their maintenance and schooling.

In attempting to give a summary of what the French Government has done for technical education, and how far it meets the wants of the nation, we cannot do better than quote once more the able report of General Morin and M. Tresca:—"On reading merely the list of names of these" (government) "establishments devoted to industrial education, we can pronounce at once an opinion as to their extreme insufficiency. One hundred engineering diplomas are awarded every year by the minister to the students quitting the central school of arts and manufactures; three hundred leave annually the schools of arts and trades with certificates of their studies; and if we add two hundred young men to represent the free students of the school of bridges and roads and the

* Independently of the various free schools for children and adults, which in towns include instruction in drawing and elementary mathematics, and evening schools for art applied to technical industry, gratuitous scientific courses are delivered at communal expense by the professors of local colleges.

school of mines, those of the schools of St. Etienne and of Alais, and lastly, the few pupils who, after the completion of their studies in the Polytechnic and other special schools, sooner or later turn their attention to industrial pursuits, we arrive at a total (rather over-estimated than otherwise) of six hundred individuals to recruit annually the intelligent and more or less educated body which directs our French manufacturing industries. If we estimate the whole number of persons engaged in these industries at 1,200,000, we perceive that the above total represents very nearly one two-thousandth of the population of our works. Admitting that the mean duration of service be twenty-five years for the one number as for the other, it follows there will be one trained man over eighty operatives; one corporal to eighty privates—but a very small proportion of captains.

"If this army of workers were not stimulated by the necessity of supporting itself, it is evident that its staff would be absolutely incapable of guiding it; it finds its way almost by itself. Without guidance or rule of conduct it continues, regarding it as a whole, to do that which it has done before; it presents an inertia which individual exertions cannot overcome. A good system of industrial education, which opens out a new horizon to those who from their youth are devoted to an industrial career, would alone be capable of exercising on them an appreciable influence, but even then we must not look for an immediate result. The new generation will differ but little from its predecessor until the system of industrial instruction be made perfectly general.

"If, in place of forming a judgment on the results of our establishments for technical education as a whole, we examine their organisation in detail, we shall immediately perceive that each one has a different object in view; that they are perfectly independent one of the other; and that, founded under the influence of completely distinct ideas, they can in no way form an entire system to be compared with the organisation of the University education, of which what are called the liberal professions reap the exclusive advantage."

When an opinion as decided as this, on the insufficiency of the government establishments, is expressed by so good an authority, it is not surprising that many private efforts have been made in France for the same object. The results of these efforts will perhaps be examined at some future opportunity.

Fine Arts.

STATUE OF DR. JENNER AT BOULOGNE.—A statue of the famous English physician, Jenner, the introducer of vaccination, has been inaugurated at Boulogne. The sculptor of the statue is M. Eugène Paul. This is not the first monument that has been erected in France in honour of Dr. Jenner.

EXHIBITION OF WATER-COLOUR DRAWINGS IN PARIS.—A remarkable exhibition of this kind is now open at the gallery situated on the Boulevard des Italiens, in Paris. M. E. Hildebrandt, a German artist, who enjoys a high reputation on the Continent, and who has travelled over the greater part of the world in pursuit of his art, exhibits no less than three hundred water-colour drawings. The differences which exist amongst the methods employed by English and foreign artists in the treatment of water-colours, apart from the ability of the artist in question, render this exhibition especially worthy of the attention of English artists and amateurs.

Commerce.

CHINESE OPIUM.—The Chinese prefer the Indian to the native drug. The native opium is, though very much cheaper, insipid, and very few of the Chinese smoke native opium unless it is mixed with the Indian. If they can get the Indian, of course, so much the better; but a Chinaman reduced to a state of poverty to which the state of opium smoking invariably leads, unable to purchase the Indian, mixes the native with the Indian, or even gathers up the cinders of Indian opium twice smoked and smokes them a third time. Native opium is sold for about 600 taels; while native Shensi opium is sold for about 400 taels. In 1862 native opium was offered in the market at 650 taels; this rise in the price of native opium was caused by political disturbances in Shensi, ultimately calmed down by means of bribes and donations, which threatened with extinction the whole trade of that province. The quantity of Indian opium imported into the Tientsin district depends entirely on the state of the Shensi crop. When the Shensi crop is deficient the demand for Indian opium increases, and *vice versa*. Of the Indian imports into Tientsin, 150 to 200 chests a month are purchased for consumption in the capital. What Pekin consumes of the native drug is not known, but the quantity must be large.

SUPPLY OF COTTON.—The following is from Messrs. Smith, Edwards, and Co.'s Circular for the 1st September:—"The prospects of our market still turn chiefly upon the supply of cotton to be expected from America, and considerable difference of opinion continues to exist upon that point; estimates, however, have a tendency to converge to a central point, and we should say that one million and a-half of bales of sound cotton as the total supply for the old stock and new crop is the favourite opinion among commercial men in America. There are some who consider one million or a million and a-quarter an adequate estimate, and a few still believe in two millions, but the great majority of competent authorities point in the direction we have stated. It is perfectly evident, however, that no certain data yet exist for forming a reliable opinion, and it is not unlikely that great changes of feeling will pass over the commercial mind before the end of the year. The progress of receipts at the ports will do much to influence estimates of the stock, and if, as seems likely, there is a period of large deliveries, we may expect a revival of larger estimates at least for a time. The receipts at New Orleans and Mobile have already reached a pretty large scale, say 30,000 bales weekly, and as the Northern consumption is only 10,000 to 12,000 bales per week at present, there is no reason why the surplus should not soon come to this country. There are now in the various American ports nearly 200,000 bales of cotton, and we think it probable that the shipments to this country will soon rise to 10,000 or 15,000 bales per week. There is, therefore, at last, the prospect of substantial relief to our spinners from the side of America, but from other quarters of the world the prospect is not hopeful. China still discontinues sending us cotton, and the supply at sea has almost run out; the importance of this fact may be estimated when we consider that she sent us 400,000 bales last year, averaging 240lbs. each, or equal to fully 200.000 bales of American cotton. Very little Bengal and Scinde cotton is also coming forward, and as we received some 300,000 bales of these kinds last year, a large diminution in them would leave a serious blank to fill up. Speaking generally, it appears likely that we shall receive a smaller supply of short-stapled Eastern cotton, at least to the extent of 250,000 bales of the size of American packages, as compared with what we got last year; and assuming that receipts from all other places continue the same, we would require to get 700,000 bales from America next year to give us a clear surplus of 250,000 bales over the receipts of 1864. This is evidently not a state of things that points to a permanent great decline in the price of cotton; and the period when full supplies of the raw material will be afforded to our manufacturing industry is obviously not yet within sight, and the stimulus of high prices will be required for years to achieve that result."

Colonies.

VINTAGE IN SOUTH AUSTRALIA.—The acreage now cultivated with vines in this colony is, 6,364 acres; during the past five years the area has doubled. Up to last season the proportion of bearing vines to those not yet productive was nearly equal; the present returns show 459,609 vines in bearing to 2,831,971 unproductive. Only a short period has to elapse before the whole of the extensive vineyards planted during the past few years will be in full bearing, so that the annual production will be annually augmented. Already the figures are high, for the vintage of the present season cannot be estimated at less than 1,000,000 gallons. That of last year was 798,647 gallons; that of 1863, 604,305 gallons. The home consumption is large, but it would be satisfactory to find a demand in a foreign market, which has not at present been the case, the exports of the year amounting to only 20,674 gallons, or 7,031 gallons less than in 1863.

LIVE STOCK IN SOUTH AUSTRALIA.—The live stock returns show an additional number of horses and sheep, but a large reduction in the number of cattle. Owing to the protracted drought in the far north it was difficult to make the returns. The number of horses is returned as 62,899, or 3,891 more than last year; 643 horses, valued at £10,996, were exported during the year. As showing the importance of this trade, it may be stated that during the past five years 3,224 horses have been shipped, chiefly to India, of a total declared value of £69,748. The total number of sheep depastured was 4,106,820, or 214,580 additional, showing an increase of 5 per cent. upon last year. During the twelve months 186,526 sheep were exported overland to the neighbouring colonies in excess of the imports, or 21,259 more than in 1863.

WATER SUPPLY IN VICTORIA.—A measure has been recently brought before the Colonial Parliament for supplying the country districts of the colony with water. For several years the metropolis and suburbs have had an abundant supply of good water from the Yan Yearn reservoir, which was constructed at a cost of £800,000 to £900,000, and is capable of containing 25,000,000 cubic yards of water. Little or nothing, however, has been done to extend similar advantages to other parts of the colony, which have experienced much inconvenience, and this has been more than usually felt during the past summer owing to the long drought. The annual rainfall is quite sufficient to furnish the colony with enough water for all purposes all the year round, but as the rain chiefly falls in winter months it is necessary to store it. Nature has afforded excellent facilities for storage, and the chief merit of the scheme submitted by the Minister of Mines is to turn these facilities to account by the construction of dams, reservoirs, and aqueducts. It is an extensive plan, embracing all parts of the colony except Gipps Land. Upwards of twenty distinct works are contemplated. The estimated cost of the whole work is about £1,200,000. As an example of the nature of the works and the quantity of water it is intended to store, and to be in a position to supply the different localities, the works contemplated for the town of Geelong may be instanced. The population of Geelong is about 25,000 inhabitants. The reservoirs to be constructed are to be capable of containing 1,000,000,000 gallons, the area of the watershed 11,000 acres, and the quantity to be supplied per diem is 1,000,000 gallons, the approximate cost of the works being £15,000. The largest work projected is the Cobban scheme, from the circumstance that the supply of water is principally obtained from that river. It will benefit a large mining and agricultural district, the population of which is 62,000. Reservoirs are to be constructed capable of containing 4,000,000,000 gallons, the area of the watershed being 64,000 acres. The quantity to be supplied per diem is 30,000,000 gallons. The estimated cost is £320,000.

Obituary.

J. G. APPOLD, F.R.S., died on the 31st August, at Clifton. Mr. Appold was well known among engineers and men of science for his great ingenuity as an amateur mechanician. His centrifugal pumps formed striking features of the Great Exhibitions, both in 1851 and 1862. He shared with Mr. Hawkshaw the credit of first suggesting the use of syphons for draining off the flood waters in the fen country, when the embankment there gave way some time ago, and, to a great extent, the paying-out apparatus used in laying submarine telegraphs was his contrivance. Some of the most remarkable proofs of his cleverness as an inventor, however, were collected in his own house and the works adjoining it. There everything that could be made so was automatic. The doors opened as you approached them, and closed after you had entered; water came unbidden into the basins; when the gas was lighted the shutters closed; a self-acting thermometer prevented the temperature rising or falling above or below certain fixed points; and the air supplied for ventilation was both washed to cool it and screened to cleanse it from blacks. Even the *gates of his* stableyard opened of themselves as he drove through, and closed again without slamming. Mr. Appold was a dresser of furs by a secret process, which he practised successfully for many years. He was elected a member of the Society of Arts in 1853, and took much interest in its proceedings.

Notes.

PUBLIC WORKS IN FRANCE.—It appears from officia returns that the great viaducts constructed on the lines of the French railways form a total of more than seven leagues in length. That of Meudon, which is about 150 yards long and 100 feet high, cost £22,400. The viaduct of Chaumont, on the Eastern line, cost £232,035; that of Mirville, on the Western Railway, £92,025; and that of Brunoy, Lyons line, £60,400. The tunnels are said to be more than 300 in number and to exceed 37 leagues in total length. The longest tunnel in France is that of La Nerthe, on the Lyons and Mediterranean Railway, near Marseilles, which cost £420,000; that of the Credo, between Lyons and Geneva, cost £260,000. The total cost of the whole of the viaducts, bridges, and tunnels on the French lines is given at £17,307,278. The new park of the Buttes Chaumont, mentioned in the *Journal* of the 4th inst., is proceeding rapidly towards completion. It is said that a million and a-half of trees and shrubs will be required for its plantation. In the same neighbourhood will be the new reservoirs for the supply of the higher parts of the city with water, and the new cattle market and general abattoirs. There are said to be 50,000 men, 6,000 horses, 20 locomotives, and 500 waggons now employed on these various undertakings. An important work, and one that has been long required, is now going on between the Rue Richelieu and the Rue St. Honoré, namely, the formation of a square in front of the Théâtre Français, three of the most miserable streets in Paris, the Rue du Rempart, the Rue Jeannisson, and the Rue Fontaine Molière, as well as a number of wretched houses in the Rue St. Honoré and the Rue Richelieu, will be wholly or partially swept away by this improvement. The Rue du Rempart stands on the site of one of the ancient ramparts of the city in front of which Joan of Arc was wounded in the thigh when besieging Paris. Two large new churches, one on the Boulevard Malesherbes, and the other at the end of the Chaussée d'Antin, are rapidly approaching completion, and another church is about to be commenced on the south side of the Seine, to be called Notre Dame des Champs. The cost of the last named is estimated at £180,000. Estimates are pro-

verbially elastic in France as well as elsewhere, and it is whispered that the new opera house, which was to cost about a million sterling, will absorb more than double, some say three times, that sum.

RAILWAY PASSENGER SIGNALS.—The French Minister of Commerce and Public Works recently issued a circular to the directors of all the railways in France on the subject of establishing signals for the security of travellers on railways, and it is said that, from the commencement of the coming year, all the carriages of every passenger train will be placed in communication with each other, and, consequently, with the conductors of the train. It is also said that mixed trains, to carry merchandise as well as travellers at reduced fares, are in contemplation.

CONSUMPTION OF RABBITS.—It is stated in a work of importance, the *Encyclopédie Pratique de l'Agriculture*, that the number of rabbits sent to the markets of Paris, which in 1845 only amounted to 177,000 heads, had risen in 1863 to two millions. Taking the consumption of Paris, according to the established rule, at one-thirtieth of that of the whole of France, the number of rabbits consumed must be set down at something like fifty-seven millions per annum. Official documents fix the average price of rabbits at rather more than two francs per head, so that the total value must be above four and a half millions sterling per annum, and that of the skins is set down at another quarter of a million.

Patents.

From Commissioners of Patents Journal, September 8th.

GRANTS OF PROVISIONAL PROTECTION.

Astronomical phenomena, illustrating—2139—J. L. Naish.
Axle boxes and bearings—2028—H. A. Bonneville.
Bedsteads, &c., sackings of—2036—H. Geering.
Bolt heading machines—2104—J. W. McDermott.
Bolts and nuts, screwing—2060—G. and A. Harvey.
Bottles, stopping—2150—J. B. Austin.
Bricks—2149—W. E. Newton.
Bricks and blocks—2068—J. W. Sumner and C. A. Scott.
Buttons—2146—C. Edkins, J. Newman, and T. Greaves.
Calf skins, &c., reducing the thickness of—2136—W. E. Gedge.
Capsules, metallic—2125—E. Rimmel.
China grass and flax, cleaning—2078—J. Faren.
China grass, &c., treating of—2114—J. Ingram and J. Culpan.
Cigarettes—2160—M. J. Lopez-y-Munoz.
Cigars—2032—A. V. Newton.
Colouring matters, preparation of—1947—P. A. F. Bobœuf.
Continuous motive power, self-generating—1973—J. J. Stoll.
Copper—2100—J. T. Lockey.
Cotton, sizing, drying, and beaming yarns of—2022—J. Gaukroger and J. Dodgeon.
Diseases of the stomach, &c., cure for—2123—O. Laurence.
Electrical signal apparatus, railway—2016—W. H. Preece.
Electric telegraph cables and wires—2161—C. Marsden.
Fibre, manufacture of straw of rye, &c., into—2171—E. H. C. Monckton.
Fire-arms—2050—W. C. Dodge.
Fire-arms, breech-loading—2030—T. W. Webley.
Fire-arms, breech-loading—2151—W. Soper.
Fire, extinguishing—2109—W. O. and J. Wilson.
Fluids, apparatus for preserving and discharging—2096—R. A. W. Westley.
Flying fish," a toy or game called—2145—G. Whitford.
Furnaces, steam boiler and other—2158—J. Lockwood.
Galvanic batteries for giving alarm of fire, constant—2144—J. S. Watson, A. Horwood, and C. Brumfit.
Gas burners—1968—F. Kup.
Gas burners—2994—H. Woodward.
Glass, ornamentation of—2038—J. H. Johnson.
Grass, &c., drying—1963—B. Latham and R. Campbell.
Guns—2014—H. D. P. Cunningham.
Hair, machinery for brushing—2058—S. Middleton.
Heating or evaporating—2072—T. F. Henley.
Hemp, &c., dyeing and preparing—2129—G. H. Smith.
Hollow articles in earth, &c., moulding—2084—R. W. Armstrong.
Hoops and tyres—1975—J. Ramsbottom.
Iron and steel wire or rods, furnace for annealing—2166—J. H. Scott.
Iron, plate or sheet—2012—E. Sabel.
Locks, burglar-proof—2092—W. E. Newton.
Lubricating compounds, preparing—2118—W. West.
Measurements, apparatus for taking—2112—W. Clark.
Musical instrument, keyed—2034—H. C. Baudet.
Packing cases or boxes—2141—J. Hope.
Paint and protective coating, composition suitable for—2163—J. G. Avery.
Paper bags—2116—J. H. Johnson.
Paper boards and pipes—2128—M. C. Szerelmey.
Paraffin and other oils, lamps for burning—2042—A. F. Osler.
Petroleum, &c., distillation of—2040—A. Millochau.
Pianfortes, &c., keys for—2156—D. G. and S. Staight.
Piers or erections, iron—1533—C. de Bergue.
Pomfret cakes, rolls, pipes, &c.—2143—W. and J. W. Wood.
Printing, lithographic and copper-plate—2170—D. McKellar.
Printing machines—2056—W. Rock.
Railway carriages and trains, retarding progress of—1954—W. King.
Railway carriages, to enable to pass from one compartment to another—2086—T. E. Stephens.
Railways and carriages, atmospheric—1987—A. Doull.
Railway trains, communicating and signalling between passengers, guards and drivers of—2052—H. Fletcher and G. Gore.
Revolving fire-arms, projectiles, and cartridges—2108—J. Broun.
Rollers or cylinders, covering for—2157—J. A. Turner.
Roof lamp-glasses, securing—2026—T. S. Raney.
Safes—2121—S. Phillips and J. Groves.
Sewing machines—2165—H. Willis and G. Rice.
Ships, cleansing and examination of bottoms of—2162—D. O. Jones.
Ships, loading and unloading of—2048—W. Clark.
Shop fronts, &c., construction of—2054—W. R. Corson.
Stair rods—2077—T. Allcock.
Steam engines—2062—H. Cartwright.
Steam, &c., regulating the passage or flow of—2043—A. A. Foubert.
Stench trap—2167—J. Newton.
Surfaces by photography, production of—2110—M. Henry.
Syphons—2168—L. J. Levisohn.
Telegraph cables—2155—F. Jenkin.
Terra cotta or vitreous stone—2071—M. H. Blanchard.
Threads, twisting—2147—R. A. Brooman.
Threads used in weaving, treating and printing—2083—R. A. Brooman.
Timber, grain, &c.. drying—2127—A. V. Newton.
Type distributing and composing machines—2135—A. and W. Young.
Violet colours for dyeing and printing, production of—2070—L. Schad.
Waggons or trucks, lubricating the axles—2090—J. Knowles.
Walls, &c., ornamenting—2138—G. Howard.
Weaving, shuttles for—2122—A. Akeroyd and J. Lister.
Wick holders or burners for lamps—2024—E. Wild and W. Wessel.
Yarns, washing—2044—W. Pollock and J. Stobo.

INVENTIONS WITH COMPLETE SPECIFICATIONS FILED.

Furnaces, steam blower for—2245—O. Bennett.
Water-closet apparatus—2270—S. Kettle.

PATENTS SEALED.

684. C. Johnson.
695. J. Tann.
697. R. M. Roberts.
701. R. Marsden.
702. H. Hill.
705. F. Wise.
709. J. Deas.
710. G. Evans.
711. R. A. Brooman.
712. R. A. Brooman.
714. E. D. Hodgson.
717. G. T. Bousfield.
726. M. Chevob.
741. W. Brookes.
745. H. A. Bonneville.
758. G. Ralston.
763. F. Wise.
772. J. T. and J. T. Cook.
848. E. H. Smith.
859. J. Buckingham.
912. H. A. Bonneville.

From Commissioners of Patents Journal, September 12th.

PATENTS SEALED.

729. A. P. Price.
730. J. F. Brinjes.
738. W. Loeder.
740. R. Bell.
748. B. Lawrence.
750. J. Bullough.
759. E. Pilling and J. Harper.
762. T. Kenyon.
768. J. H. Kidd & J. C. Mather.
797. H. Potter.
820. H. Oakes.
832. W. Loeder.
917. J. Bathgate.
953. J. Vaughan.
955. W. E. Newton.
1031. W. E. Newton.
1050. W. E. Newton.
1240. J. H. Johnson.
1592. J. Hayes.
1858. S. Hingley.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

2459. J. R. Johnson and J. A. Harrison.
2461. J. Snider.
2472. J. Hartshorn & W. Redgate.
2506. W. Richards.
2476. A. J. Alderman.
2481. W. Hirst.
2474. G. W. Belding.
2520. G. Bedson.

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

2014. J. Fielden.
2069. L. Kaberry & T. Mitchell.
2081. L. Vidie.
2175. J. Morrison.

Registered Designs.

Improved Back Guide—August 29—4738—John and Samuel Smith, Low Bridge Mill, Keighley, Yorkshire.
Bar of Soap—September 5—4739—Whitaker and Grossmith, 120, Fore-street, City-road.
Feeding Trough—September 11—4740—J. Dean, Woodstock.
Liquor Glass and Wine Glass—September 12—4741—Barrett and Mackenzie, Birmingham.